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GB 1570107 A GB 0371538 A US 4689531 A

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## (54) Battery powered electric vehicle

(57) The vehicle has a traction battery 15 to power a traction motor 11, and alternator 13, 14 normally driven by an auxiliary motor 12 powered by an auxiliary battery 16 to charge batteries which power appliances such as headlights.

If the auxiliary battery 16 is in a low charge state, it may be recharged by alternator 14 driven by auxiliary motor 12 powered by the traction battery 15.

If the traction battery 15 is in a low charge state, it may be recharged by alternator 13 driven by auxiliary motor 12 powered by the auxiliary battery 16.

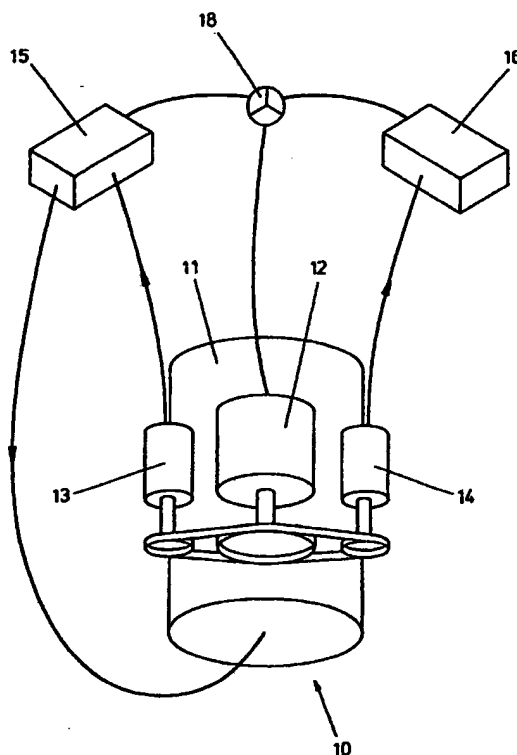


FIG. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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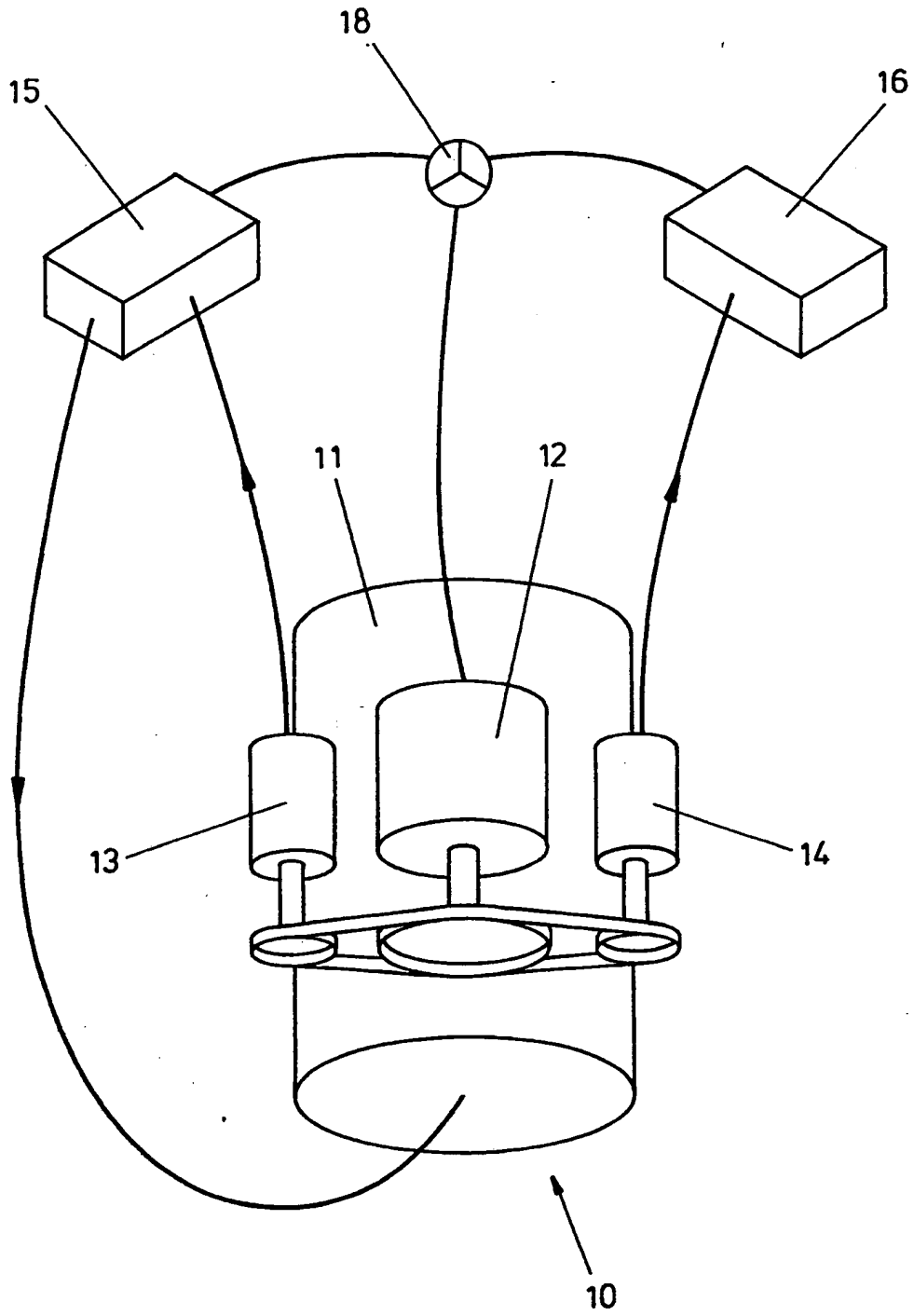


FIG. 1

## ELECTRIC MOTOR

This invention relates to an electric motor of the type used to power a vehicle, such as a car.

A problem with known electric motors for vehicles is that the batteries from which they are powered require frequent recharging. This means that it is not possible to make long journeys in a vehicle having an electric motor.

Often a vehicle will have a main battery for powering a main motor which is used to run the car and a subsidiary battery for running a subsidiary motor, used to drive alternators. The alternators charge the subsidiary batteries which power electrical appliances such as car head lights. If one or more such appliances is left on, the main or subsidiary battery may run down, thus requiring charging before the vehicle may embark on or continue a journey.

According to the invention there is provided a motor system comprising:

- a first electric motor powered by a first battery;
- a second electric motor powered by a second battery;
- a first alternator driven by a motor for charging the first battery; and
- a second alternator driven by a motor for charging the second battery.

By means of the present invention, it is possible to make a long journey in a vehicle which is powered by an electric motor.

Under normal running conditions, the first electric motor is powered by the first battery and the second electric motor is powered by the second battery. The first electric motor may be used, for example, to run the car and the second electric motor may be used, for example, to drive the alternators. If the batteries need charging the second electric motor drives the first and second alternator. The first alternator charges the

first battery, and the second alternator charges the second battery.

Preferably the system further comprises a three way switch for allowing the system to be switched between a running mode, a first charging mode in which the first battery may be recharged, and a second charging mode in which the second battery may be recharged. Before the switch can be switched into the first or second charging modes, the vehicle must be stationary and the first and second motors and all electric appliances must be switched off.

The first electric motor is the main electric motor and the second electric motor is an auxiliary motor.

The invention will now be further described by way of example only with reference to the accompanying drawing in which Figure 1 is a schematic representation of the electric motor according to the present invention.

Referring to Figure 1 an electric motor according to the present invention is designated generally by the reference numeral 10. The electric motor system according to the invention comprises a first electric motor 11 and a second electric motor 12. Associated with the system 10 is a first alternator 13 and a second alternator 14. The first electric motor 11 is supplied with power by battery 15 and the second electric motor 12 is supplied with power by battery 16.

The motor system 10 is particularly suitable for use in a vehicle such as a car. The motor 11 will be used to run the vehicle and the motor 12 will be used to drive the alternators which charge the batteries which power electric appliances such as head lights. The system 10 further comprises a three way switch 18. When the car is running normally the switch will be in an off position.

In a situation where battery 16 runs down, the switch 18 will be switched into a first position in which battery 15 powers the small motor 12, normally powered by battery 16. The alternator 14 will then be used to recharge battery 16. The alternator 14 is driven by the small motor 12.

Similarly, if battery 15 runs down, the switch is switched into a second position in which battery 16 will run the small electric motor 12, which drives an alternator 13 which in turn charges battery 15.

In an alternative embodiment a simple on/off switch may be inserted between battery 16 and motor 12 and battery 15 and motor 11. This will allow the driver to disconnect the motor from the alternator if either of the batteries 15, 16 is already sufficiently charged. This will avoid overcharging of batteries 15, 16 while the car is being driven.

Two examples of how the electric motor of the present invention may operate will now be described.

#### Example 1

If battery 15 needs charging the switch 18 is switched into a second position for battery 16 to supply power to electric motor 12 for the alternators to charge both batteries. Battery 15 will supply power to electric motor 11 to run the car, and battery 16 will power electric motor 12 and electric appliances.

#### Example 2

If battery 16 needs charging the switch 18 will be switched into a first position, where battery 15 will supply power to both electric motors, and battery 16 will be used only when it has been sufficiently recharged.

By means of the present invention, if a battery of a vehicle runs down, it is possible to make a further journey to reach a place such as a garage where the batteries may be recharged by an independent source.

CLAIMS

1. A motor system comprising:
  - a first electric motor powered by a first battery;
  - a second electric motor powered by a second battery;
  - a first alternator driven by a motor for charging the first battery; and
  - a second alternator driven by a motor for charging the second battery.
2. A system according to claim 1 further comprising a three way switch for allowing the system to be switched between a running mode, a first charging mode in which the first battery may be re-charged, and a second charging mode in which the second battery may be re-charged.
3. A system according to claim 1 or claim 2 wherein the first electric motor is the main electric motor and the second electric motor is an auxiliary motor.
4. A system substantially as hereinbefore described with reference to the accompanying drawings.

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**Date of completion of Search**  
**16 NOVEMBER 1993**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

**Documents considered relevant following a search in respect of Claims :-**  
1-3

**X:** Document indicating lack of novelty or of inventive step.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**A:** Document indicating technological background and/or state of the art.

**&: Member of the same patent family; corresponding document.**